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A METROPOLITAN STATISTICAL PROGRAM FOR THE NATIONAL CAPITAL REGION

STAFF STUDY

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JOINT COMMITTEE ON WASHINGTON METROPOLITAN PROBLEMS

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FOREWORD

The metropolitan region has so recently emerged in the national scene that the joint committee's consultants, Surveys & Research Corp., are correct in approaching its continuing statistical requirements almost as they would those of an underdeveloped country where such activities are just being inaugurated. Furnishing the data for metropolitan planning and decisionmaking will require changes in existing Federal statistical procedures, the coordination of much that is now being done by local public and private agencies, and some new activities of collection and interpretation. A survey of these requirements and recommendations concerning how they can best be met is given in the following report, the principal authors of which are Dr. Stuart A. Rice, Jeremy C. Ulin, and Libert Ehrman.

The major emphasis given to the statistics of water, transportation, and economic development reflects the joint committee's concentration upon these topics. However, there is no slighting of the related needs of regional land use and planning. The proposed organizational structure for statistical collection and analysis is designed, furthermore, to develop with the evolution of metropolitan government.

FREDERICK GUTHEIM, *Staff Director.*

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A METROPOLITAN STATISTICAL PROGRAM FOR THE NATIONAL CAPITAL REGION

I. INTRODUCTION

The Washington metropolitan area is unique among urban agglomerations in having the Federal Government of the United States directly responsible for the administration of one of its chief components. Inasmuch as the seat of Federal Government in the District of Columbia is rapidly expanding outward into neighboring jurisdictions in the adjacent States of Maryland and Virginia, the entire metropolitan area and its problems are of intimate concern to the Congress. The Joint Committee on Washington Metropolitan Problems was created in recognition of this special Federal concern with the problems of a particular urbanized area. Among the numerous and complex issues before the committee none is more vital for the success of its ultimate objectives than the problem of access to reliable statistical information, on an areawide basis, upon which to base developmental programs. The task assigned us by the joint committee looks toward the satisfaction of this requirement. We were asked to prepare a report on—

the development of area statistics and continuing data processing in the Washington metropolitan area.

Great latitude was left us for the interpretation of this assignment.

STUDY APPROACH

First, our attention has been concentrated on three major fields of subject matter that the joint committee and its staff consider to be the most important from the standpoint of area growth: water supply and pollution, transportation and highways, and economic development. Other subjects undoubtedly deserve attention at the area level, and the statistical program we envisage, once established, might appropriately be extended to them.

Second, within the three subject-matter fields just named, we have found no precise and authoritative statement of the leading issues or purposes of public policy which might serve as guidelines in determining the data needed. Data are usually demanded to help solve policy issues, but what if the issues themselves are unformulated? Without the guidance of such a statement, the statistician must surmise policy and lean upon his assumptions regarding it. In this report we have placed considerable reliance on the viewpoints of outstanding authorities with respect to the most significant issues, resolving differences among them in accordance with our own best judgment.

Third, the content of our suggested statistical program, or of any such program, is of little consequence without an effective organi-

zation to carry it out. An essential part of our task, therefore, has been to recommend such an organization and to define its functions. We cannot stress too strongly that such an organization should be continuing. However, the organization can be conceived in any of a number of ways and made responsible for one or several different functions. Is it to be primarily a coordinating agency, pulling together data obtained by others? a control point for standardizing or improving the quality of data others gather? a medium for collecting original information through its own staff? While questions of this kind should condition the outline of a statistical program, we have found it more convenient to separate our discussion of the statistical program and the statistical agency, dealing with each separately. Program content will be considered in terms of the apparent need as we conceive it, regardless of implications for statistical organization. The statistical agency that we propose will be sufficiently broad in character to adapt its functions to whatever program may be adopted.

Fourth, we limit our discussion of statistical program content to the more important and general considerations, without working out detailed requirements. That is a function which should be entrusted to whatever continuing statistical organization may be created. Once established, this organization can be expected to modify the program we propose in accordance with changed policies or needs and to engage in detailed planning of its components. We aspire in this report to suggest a broad program which such an organization could use as its starting point, to extend or amend.

Fifth, our report relates to the standard metropolitan area (SMA) of Washington, which includes the District of Columbia, Montgomery and Prince Georges Counties in Maryland, Arlington and Fairfax Counties and the independent cities of Alexandria and Falls Church in Virginia. With the rapid development of Loudoun and Prince William Counties, it may be desirable to include them in future studies, but their present exclusion does not affect our findings and proposals, nor would their inclusion in a statistical program offer special difficulties.

Sixth, we are primarily concerned with needs for statistical data on a continuing basis. Nonrepetitive surveys and nonstatistical research needs are not excluded, but are not within the focus of our interest. This permits us to think of our assignment in terms of a needed statistical program, with only occasional reference to special studies.

Seventh, our answers to the assignment given us have been conceived in terms of communitywide cooperation, embracing governmental agencies ranging from Federal to county and city, and including also social and community organizations and business firms and associations. Thus, in defining the structure and tasks of a central statistical unit for the area, we have not felt limited by the restrictions which usually apply to governmental instruments. We have no apologies for employing our imaginations in conceiving of an organization in which all of the interests we have mentioned may participate and from which they may benefit.

WORKING METHODS AND PROCEDURES

Three major elements have contributed to the preparation of this report: examination of written materials, meetings and discussions with key people in the Washington metropolitan area, and independent analysis and evaluation. While our indebtedness to others for information is great, far greater than can be individually acknowledged here, the responsibility for the conception and content of this report is primarily that of members of the staff of Surveys & Research Corp., particularly Stuart A. Rice, Jeremy C. Ulin, and Libert Ehrman.

Written materials of special value in our work have been the staff studies prepared for, and the hearings conducted by, the joint committee. We believe they constitute an important reservoir of information about metropolitan-area problems.

Among the more than 100 persons consulted about various aspects of regional statistical problems were numerous important users of statistics as well as persons charged with their collection or publication. They included regional planners and members of their staffs; highway and transportation officials; water and sanitation administrators and technicians; school board members; revenue, tax, and licensing officials; employees of utility services; officials of Federal data-collecting agencies, such as the Bureaus of the Census and Labor Statistics and the Department of Commerce; research people at boards of trade; and other experts on various urban problems.

SUMMARY OF MAJOR RECOMMENDATIONS

1. That the Congress authorize the development of a statistical program for the Washington metropolitan area, to provide data needed for areawide planning; and that the Congress take any necessary steps to create a continuing statistical agency to develop and conduct such a program.

2. That the statistical agency here recommended have the following functions:

(*a*) responsibility for the continuing development of a statistical program for the area;

(*b*) coordination of relevant area data now collected by Federal, State and local agencies of government and by private firms and organizations;

(*c*) assistance to other agencies in developing area statistical activities, with collection of primary data by its own staff when deemed appropriate;

(*d*) provision of central statistical services related to the metropolitan area, including data processing when these are otherwise unavailable or inadequate; provided that these services shall be available to both public and private users on a fee basis;

(*e*) maintenance of a central repository and index of statistical information relating to the area.

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3. That all agencies and interests requiring data for small geographic areas utilize census tracts or other units consistent with census tracts in classifying, tabulating and publishing those data.

4. That arrangements be made with the United States Bureau of the Census for enumerations of the population of the Washington metropolitan area midway between the Federal decennial enumerations, beginning in 1965.

5. That the feasibility of developing procedures for the systematic maintenance of data relating to land use and housing within the area be determined, and if not feasible, that periodic central collection of such data be undertaken.

6. That a thorough evaluation of existing data and data requirements for planning a future areawide transportation system be made and that this be done before deciding whether presently available data should be continuously maintained.

7. That in the specific field of water and sanitation, where statistical data is growing in volume and importance, and the needs for coordination and comparability are becoming imperative, the recommended statistical agency assume this task. Among the data needs in the water field, emphasis should be given to such neglected fields as:

(*a*) the collection of data essential for determining the potentialities of groundwater as a component of the metropolitan area's future water supply;

(*b*) studies permitting reliable estimates of siltation rates and determinations of its major causes on the Potomac and other streams of the area;

(*c*) coordination of water quality sampling programs.

II. NEED FOR A METROPOLITAN AREA STATISTICAL PROGRAM

The indivisibility of many of the problems with which local governments in the Washington metropolitan area are separately contending has been recognized only slowly by most of the officials and citizens affected. Even slower in affecting their thinking has been a perception of the need for comparable statistical data for use in overall planning. The idea of a statistical program for the area, as distinct from the units of which the area is composed, is too new to have acquired clear definition, let alone implementation. Yet implicit or explicit in the testimony of most of the experts whose views have been presented to the joint committee are the needs for such a program and an organization to effectuate it.

Hammer & Co.'s recent staff report [1] asserted:

> The importance of a vigorous program of research and information on a comprehensive areawide basis cannot be overemphasized. Far from being an academic exercise, a well-executed and appropriately used research and information program is one of the most powerful tools available in economic development operations. Conversely, inadequate basic research can seriously hinder an otherwise adequate development program. * * * There should be "a continuing inventory of basic metropolitan area statistics."

Mr. Paul C. Watt, Director of the National Capital Regional Planning Council,[2] contends that—

> There is a distinct need for the establishment of a central data clearinghouse for metropolitan areas, so that everyone concerned with the metropolitan problems can have comparable current data for research, planning, and developmental decisions. Keeping the fund of essential data current is a project in itself.

Dr. Jerome Pickard, of the economic development committee of the Washington Board of Trade, in a recent memorandum to Frederick Gutheim, of the joint committee staff,[3] has presented personal views upon the needs and specifications for the collection of data which "should be available for the entire standard metropolitan area."

The preceding statements expressing the general need for a statistical and research program for the metropolitan area can be fully documented by reference to almost any major problem affecting the community at large. The limits of time imposed upon this report do not permit complete documentation here. However, in the following three chapters some of the major deficiencies of data necessary or important for adequate understanding of and decisionmaking for transportation, economic development, and water problems are indicated. The purpose of this section is to summarize the leading conditions which give rise to the need for an organized regionwide statistical effort for all or any area problems.

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[1] Economic Development in the Washington Metropolitan Area, Staff Study for the Joint Committee on Washington Metropolitan Problems, Government Printing Office (1958), p. 41.

[2] Hearings before the Joint Committee on Washington Metropolitan Problems, 85th Cong., 2d sess., on Economic Development in the Washington Metropolitan Region, July 8, 9, 10, 1958, Government Printing Office (1958), p. 204.

[3] Memorandum from Dr. Jerome C. Pickard to Frederick Gutheim on data for the Washington metropolitan area, August 29, 1958.

EXISTING INFORMATION FOR AND WITHIN THE AREA

The number of sources from which data pertaining to the Washington metropolitan area and its geographic components can be obtained is almost without limit. These sources are to be found within three major groups: the Federal Government, agencies of local and State governments, and private organizations. Nowhere is there a single repository of a significant amount of available information, although it is worthy of note that an informal group of researchers under the guidance of Dr. Jerome Pickard, of the Washington Board of Trade, is currently taking steps in that direction. Investigators must accordingly fend for themselves in locating relevant data.

Even where the existence of information is known, it is not always in a form convenient for use by unsophisticated, though intelligent, persons. This situation characterizes much Federal data, which are often in "raw" form and in addition are grouped together with information for many other communities.

The separate governmental jurisdictions within the area provide seven areal units. The financial and other information they collect, however, must first of all serve their own administrative needs. Such data are frequently noncomparable, one jurisdiction with another. Even if superficially similar, they may have been obtained for slightly differing purposes, by differing methods and standards, possibly for differing time periods or on different dates. They may have employed different definitions even if the items of information are the same. The quality of such data is usually questionable. Moreover, many of the facts collected are not organized in a form suitable for statistical compilation. In such situations, the problem is one of statistical coordination—to effectuate such revisions of questionnaires and forms, definitions, time periods, coverage, etc., as will permit comparisons among data from separate sources without sacrificing their administrative value for those who in any instance collect them.

One of the major enterprises of social scientists in the last half century has been to standardize small areas in urban communities in such a way that the statistical data procured for them may be comparable from one time period to another, or between one survey and another. These efforts have resulted in the demarcation of "census tracts" in all large cities (including Washington) and in many portions of their fringe areas. The difficulty has been to secure uniformity in the statistical use of these or other small areas. Each investigator may conceive that a different pattern of areal subdivisions will best serve his own immediate purposes; with the consequence that his findings cannot be compared in any detail with those of another investigator. The possibility of discovering relationships that neither investigator may have had in mind is thus lost. This situation has characterized much of the statistical research in the Washington metropolitan area, to the extent that some students of its problems have called for the use of a grid system, based upon rectangular coordinates independent of streets and "natural" boundaries, for the development of small-area statistics.

NEED FOR A COORDINATING AGENCY

The problems of coordination do not pertain only to differences among the data collected by neighboring governmental jurisdictions. The same kinds of differences may be discovered within the same local government, or even within the same department thereof.

An instance is provided by a thorough 3-year reassessment survey recently completed by the Assessment Office of the District of Columbia. Every structure in the city was examined and over 100 items of detailed information were obtained for each building. Data were entered on individual cards (some 170,000 in all) to be used as a permanent record. Yet, apparently no other municipal agencies interested in housing or land use were consulted in the design of the survey; the value of the information for more general statistical purposes was not foreseen, or perhaps ignored because of budget and time limits; and interested city officials are now trying to figure out how this gold mine of data can be put in manageable form to serve purposes other than those for which it was originally obtained.

Numerous other illustrations of uncoordinated effort could be cited. Public schools generally obtain fairly detailed information about their own students, but no public agency combines this information with similar data on private- or parochial-school children. Financial and regulatory units of most local governments collect considerable data about new and modified structures, but they rarely organize it in a form to make it of use to planning agencies or other public groups in the same community.

The one outstanding fact about virtually all locally collected statistical data is that they are obtained essentially as a direct byproduct of particular administrative responsibilities. They are seldom the result of a considered evaluation of information needs by the city, county, or region as a whole. Public administration has grown "like Topsy." When the area is viewed as a single whole, the administrative agencies that must be utilized in the effectuation of programs are found to lack means for effective cooperation. Common purposes cannot easily be discovered, nor can resources easily be pooled in support of those common objectives that are recognized. No agency or individual is responsible for bringing information obtainable from diverse sources into harmonious relationships.

Noncomparable data on the same or related subjects may be worse than useless because they may be put together unguardedly and lead to erroneous conclusions. This is another hazard presented by the disorganized state of local statistics within the Washington metropolitan area. In the absence of a statistical program of authenticated statistical information and a central statistical organization for the area, untrained persons are encouraged to "do it yourself." The statistical projections of future area developments and requirements that result do not inspire confidence.

The remedy for all of these hazards and present statistical disabilities is a regional statistical program, guided by a central statistical

organization, under constant improvement and modification by competent statisticians in the light of evolving public policies and needs.

MUNICIPAL STATISTICS IN THE UNITED STATES AND EUROPE

The defects we have cited are not unique. Similar deficiencies might have been found as recently as a quarter century ago within the Federal Government of the United States; and they probably are fairly typical of local government in this country today. It may be worth noting that municipal and other local government statistics in the United States have lagged behind those of other countries, especially in Europe. Many European cities have long issued statistical yearbooks, comparable in the number of tables and in the variety of their subject matter to those included in the Statistical Abstract of the United States, compiled by the Bureau of the Census. The International Statistical Institute, in cooperation with the International Union of Local Authorities, has brought together approximately comparable population data for 154 European and 2 Egyptian cities. In most cases the data pertain to territory within the boundaries of municipalities, though a few include suburban areas.

However, municipal and local government statistics in the United States are beginning to develop. Thus, the Department of Commerce and Public Events of the City of New York has recently begun the assembly and publication of New York City Monthly Statistics. The issue for October 1958 contains information upon 47 items pertaining to employment and earnings, 24 respecting construction and real estate, 18 relating to retail business activity, 30 on general business activity, 20 on transportation, 19 dealing specifically with the port of New York, and 21 miscellaneous, all dealing in one way or another with the city economy. Other sections are concerned with the cost of living, population trends (within the city as a whole), the weather, and city government.

Cities and counties in the Washington metropolitan area generally publish far less statistical data than are now regularly available for New York City, and rarely on a monthly basis. A great proportion of the data they do provide are "workload" statistics, of interest largely to the various agencies involved for management purposes. Comparatively little statistical data of value for economic planning and development purposes are continuously provided. They are generally issued under the auspices of the various collecting agencies, and are not assembled together. This necessitates considerable effort on the part of interested users.

Perhaps of greater significance from a regional standpoint than the venture of New York City into the monthly publication of statistics is that a committee for the New York-northern New Jersey metropolitan area was established early this year by major private and public agencies of the area to overcome existing statistical deficiencies and develop an integrated, areawide statistical program.

Notable also has been the existence since 1932 of the Cleveland Real Property Inventory, a nonprofit venture financed by various public and private groups, which has conducted an annual census of dwelling units and other buildings by census tracts in a large portion of the metropolitan area. No comparable regional effort to collect essential information on a continuing basis has been attempted in the Washington area.

ASSUMPTION OF STATISTICAL TASKS BY PLANNING OFFICES

Perhaps the greatest indication of need for a statistical program for the Washington metropolitan area is to be found in the actual behavior of responsible officials of the Federal and local governments and of private groups in the community. At the local level, planning offices have generally assumed major responsibility for collecting statistics because no one else does the job. They regard statistics as vital for planning purposes. They complain of the inadequacy of available information and of their inability to keep what information they can get up to date. There is not a single local governmental unit within the standard metropolitan area which has a statistical office per se, or a statistician with responsibility for coordinating the collection or publication of statistical data.

The closest approach to a recognition of the need for this function has been made by the District government which recently established a statistical coordinating committee. However, the committee has only begun to scratch the surface. In general, each public agency throughout the area collects information in terms of its special needs, without regard to the potential or actual interests of other groups.

THE CONGRESS SHOULD AGAIN TAKE THE INITIATIVE

Some 23 years ago the Congress became aware of the need to achieve effective statistical planning and operating relationships among the numerous data-collecting agencies of the Federal Government. It established an independent agency for statistical coordination, with powers and functions which were later extended and transferred to the Bureau of the Budget, by which they are now exercised. A similar recognition by the Congress of the needs for a regional statistical program for the Washington metropolitan area, and for a continuing organization to develop and administer the program, would be an analogous step forward, of inestimable importance for urban development within the United States. By taking such action in the one urban area for which it shares direct administrative responsibilities, the Congress would establish a pattern which other metropolitan areas throughout the Nation would undoubtedly imitate.

III. A STATISTICAL PROGRAM ON TRANSPORTATION AND HIGHWAYS

BACKGROUND

Perhaps no other single problem in the Washington metropolitan area more vitally affects the lives of its inhabitants, and simultaneously results in greater aggravation, than that of transportation and highways. "The traffic problem" is fast becoming a cliché, a serious prospective candidate for memorialization next to death and taxes as permanent fixtures on the urban scene.

The origins of the problem are easily identified. They may be summarized as kids, cars, concentration, and confusion. Rising birthrates (coupled with lowered death rates) are causing rapid growth of population. Higher living standards, desire for status symbols, and the convenience of mobility have changed the role of the automobile from a rich man's privilege to the common man's "necessity," wih a corresponding decline in public-transit usage. People and their cars have gravitated primarily into and around the large employment centers like Washington, designed for an earlier gracious era of the trolley and carriage. Confusion, often called "urban sprawl," has attended these social developments through the failure of the community to channel them into an overall plan adapted to its requirements.

Given these circumstances, and the lack of any magic formula to accommodate them, their victims (who include practically all of us) freely propose remedies which defy convenient verification, but which at least serve to ease the conscience of those charged with responsibilities for improvement.

Highway engineers urge bigger and better highways, while transit officials and some traffic consultants contend for rapid transit systems. Public and private employers as well as many customers and workers seek better parking facilities in concentrated employment and shopping areas, while many planning officials prefer various alternatives, ranging from almost total exclusion of vehicles from the downtown area to restriction of automobile travel or parking in selected closed-off streets. A distinguished Greek city planner currently visiting Washington has submitted the novel suggestion of mass water transportation on the Potomac to serve Virginia commuters.

Underlying these contrasting notions is a constantly changing geographic setting within which alternative transportation facilities must be considered. Explosive residential expansion of outlying areas continues at a breakneck pace, while large Government agencies "disperse" and new commercial and industrial enterprises develop in formerly remote sections of the suburban fringe. Stagnant or dying areas of the central city are being redeveloped, frequently altering the conditions for which transportation facilities must be conceived. These dynamic elements are in part the result of current difficulties with transportation services and in part the cause of new ones.

POLICY AND PROBLEM SETTING

Out of the morass of conflicting values and constantly changing factual circumstances, how can we establish a framework within which the requirements for statistical data about highways and transportation in the metropolitan area may be evaluated? The necessity of approaching transportation and highway problems on a regional basis seems axiomatic. Where do we begin?

A very basic consideration must be our conception of transportation in the community. For example, if we begin with the idea that the metropolitan area's transportation system must be planned on an efficient, long-term basis, with land use and economic development accommodating themselves to rigid requirements of predetermined transport design, planning of the system would require little continuing information. Whatever the merits of this approach (and we believe there are many), it has never to our knowledge been tried in United States metropolitan areas and is probably not feasible.

A more likely premise for a statistical program would be that the transportation system must reflect, rather than determine, changing conditions of land use, economic development, and public demand, and be adapted to them. This is, in fact, the approach customarily taken in this country, and despite obvious difficulties is the one probably best suited to the realities of Washington area planning. Given this point of departure, it is clear that many types of data are needed to plan future transport facilities.

If we therefore assume that the function of an overall transportation system is to serve effectively needs thrust upon it and over which it has little control, the fundamental issues of policy for which data are necessary can be readily stated: What kind of a transportation system is needed for the community 5, 10, or 25 years from now? How will, or should, it be distributed among competing methods, such as private automobiles, buses, and other motor vehicles on highways; rapid transit via rail, subway, rivers, and other methods. And, especially, how is it to be geographically distributed within the area?

To provide answers for these questions, data must be developed which will throw light on the overall potential demand for transportation between various points in the metropolitan area (and outside), the major determinants of total demand, and the relative demand for alternative means of transport and their determinants. And if the transport system is further to be geared to peak-load demand, rather than to "average" or "normal" demand, great emphasis in the accumulation of data must be given to those particular time periods. As in most other large urban areas, the critical dimension of the Washington transportation problem focuses around morning and evening rush-hour periods. During those hours we have our peak traffic loads, our bottlenecks. Other transport difficulties pale by comparison.

Other transportation problems may require factual data for their solution. One notable example is the rapidly growing impact of leisure time and recreation on weekend travel, resulting in highway congestion. But for the present we believe the collection of statistical data might well be limited to traffic problems during rush-hour periods, their magnitude, and their underlying causes as they relate to future demand for transport facilities.

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DATA REQUIREMENTS

What then are the information requirements for forecasting traffic loads throughout the area during rush-hour periods? Clearly the most important kinds of data needed are estimates relating to the future numbers of trips made at those intervals in relation to small geographic areas. To make meaningful estimates, however, it is also necessary to understand the major purposes of trips made as well as their underlying determinants. As Mr. Robert Mitchell, city planning department chairman at the University of Pennsylvania, notes—

> projection of future interregional traffic by any method is based largely on a future land use pattern.[4]

Furthermore, previous studies have shown that by far the most important component of travel made during rush hour periods is commuting between residence and place of work. Therefore great emphasis must be placed in forecasting future traffic loads on the future size and composition of employment, its geographic location (and hours of work), and the residential location of employed persons in relation to where they work. The following discussion is primarily devoted to those questions.

Assumptions or estimates must also be made concerning the methods of travel used, by number or proportion of persons for each mode or vehicle, and by small geographic units. Finally, all estimates must be expressed in terms of periodic (hourly or smaller time unit) traffic flow on specific routes, although that is a function perhaps better performed by traffic engineers than by statistical researchers.

Of critical significance in the above estimation process is the size of geographic units (or "traffic zones") necessary for effective analytical purposes. They must obviously be small enough to provide a meaningful basis for transportation planning. But there is little point in designing the size of traffic zones for a level of detail much greater than the character of various assumptions or the data used permits. In other words, the chain of forecasting is no more accurate than its weakest link.

Of still greater importance is the basis upon which estimates are made, including empirical data and assumptions for which data are lacking. Studies of existing travel patterns between home and work (often by "origin-destination" surveys) can suggest the influence of time and distance upon the deployment of residence in relation to place of work, as well as upon the selection of travel methods. Such data as income, age, sex, race, education, automobile ownership, occupation, and especially motives and attitudes of commuters in commuting travel would be valuable for indicating possible correlations between these or other characteristics and actual travel patterns indicated by origin-destination surveys. Taken together, travel pattern and socioeconomic data would be especially valuable is establishing a fairly predictable traffic result from the creation of employment at given places.

In point of fact, discussions with competent authorities indicate that traffic characteristics have proven to be pretty well correlated with

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[4] Memorandum from Robert B. Mitchell to Frederick Gutheim on the Job Ahead in Transportation, April 20, 1958, reprinted in the hearings before the Joint Committee on Washington Metropolitan Problems, 85th Cong., 2d sess., on Transportation Problems in Maryland, Virginia, and the Washington Metropolitan Area, May 22, 23, and June 10, 1958, Government Printing Office (1958), p. 334.

employment. The major limitation of traffic demand projections based upon employment is that the future location of employment cannot in practice be accurately determined. There are several reasons for this difficulty. Foremost among them is the common practice of large Federal agencies to "plan" moves to remote sections of the metropolitan area without much notice. Recent decisions to locate the AEC at Germantown, the Bureau of Standards at Gaithersburg, the CIA at McLean, and the new airport at Chantilly, for example, are significant determinants of future transportation requirements which could not have been forecast very long in advance. Another factor contributing to the difficulty of estimating future employment location is the inability of some local communities, principally through zoning regulations, to decide what specific types of industry they want to accommodate, and to adhere to basic land use and zoning plans once decided.

If Government agencies are comparatively free to relocate with a moment's notice and zoning authorities to change basic land use plans at will, the value of detailed traffic study and forecasting techniques is seriously impaired. In the pungent language of Carl Feiss, planning and urban renewal consultant, as used in his prepared statement before the joint committee:

> The present degree of free play in areawide regulations make the bones of a sound regional transportation system rattle hollowly in the nightmare of metropolitan sprawl.[5]

However questionable, assumptions concerning land-use or employment must underlie forecasts of probable future traffic consequences.

One of the commonly made assumptions about future demand for transportation services between residence and place of work in almost all forecasts is that the proportion of public transportation to private transportation used will remain more or less the same. In Washington that is tantamount to assuming that the major transportation load will be carried by private car. One of the major factors in nonuse of public transit facilities is their comparative slowness, a problem which is aggravated by increasing use of private cars. It is probably reasonable to assume that any important shift from private to public transport would significantly lessen bottleneck problems and hence the demand for more highways, the construction of which seems usually to generate new traffic rather than to relieve congestion.

For these reasons, we believe special attention might well be given to collection and analysis of data seeking to ascertain the underlying psychological, sociological, and economic factors which affect and determine public attitudes toward and usage of, private and public transport. Particular efforts should be placed upon determining the potential acceptability of a truly rapid transit system, under various conditions of cost, time, and station location, despite difficulties of making such a determination. Experience of other metropolitan areas like Chicago and Toronto with comparable problems may be instructive. However, as the Greek planner currently serving as a consultant to the District Redevelopment Land Agency, Mr. C. A. Doxiadis, recently said:

> You must build a mass transportation system. You will not know until you have one whether people will use it. They drive now, because they don't have one.[6]

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[5] Ibid., p. 369.
[6] Washington Evening Star, November 26, 1958, p. B–1.

This statement deserves attention because it suggests limitations of research in providing complete answers to transportation problems, and because it implies that courageous decisions by responsible leaders in the community may be necessary, particularly where fully adequate supporting information is unobtainable.

STATUS OF AVAILABLE DATA

Two principal bodies of statistical data, both employed in the mass transportation survey now in the final completion stage, are currently available to meet needs. One body of data consists of complete weekday travel patterns by purpose and by small geographic area ("traffic districts and zones") derived from the two origin-destination surveys carried out in the Washington metropolitan area in 1948 and 1955, respectively, under the auspicies of a regional highway planning committee, consisting of representatives from the District, Virginia, and Maryland Highway Departments and the Bureau of Public Roads. The other set of data consists of estimates of population, dwelling units, labor force, employment, income group, retail sales and automobile ownership for 1955, 1965, and 1980, all by small geographic areas, as prepared by the Mass Transportation Survey staff, National Capital Planning Commission and National Capital Regional Planning Council.

While both sets of data were prepared for special one-time purposes, the principal interest in them in this report is their value as types of information for a continuing statistical program. In our judgment both types of data require substantial modification and improvement of content as well as technical reappraisal.

The inherent limitations of origin-destination survey data as tools for predicting future traffic needs should be clearly understood so that they may be assigned a role in a statistical program that fits their actual value. Origin-destination surveys can indicate present traffic-flow patterns only. They express the net result of all the underlying factors influencing those patterns without permitting identification of the individual factors. Because simple expansion of and origin-destination travel pattern cannot reflect anticipated changes in those factors (such as new employment or new highways), they are generally inadequate for forecasting purposes and useless for forecasting when applied to growing areas not now represented by significant travel patterns.

Origin-destination surveys are of major value in estimating parameters (such as time and distance) required in forecasting methods, such as the gravity-flow model, and in validating them later. But they are not necessary for every new forecast and, as forecasting models are progressively improved and validated, the usefulness of the origin-destination surveys will consequently diminish.

Furthermore, to the degree that origin-destination surveys are useful, the amount of data obtained in the 1948 and 1955 surveys can be substantially reduced: trip information for periods other than rush hours is probably unnecessary under the assumptions stated in our discussion of the policy framework for data requirements.

Finally, where origin-destination data are needed, at least three of the important survey methods employed should be reevaluated and/or modified. First, adequate results for commuting traffic patterns might be obtained more efficiently by a sample of business establishments rather than of households, now a part of standard origin-destination procedure. This possibility should be studied by statisticians who are expert in experimental design techniques. Second, the reliability of origin-destination data can be improved by tightening up the sampling procedures currently used. In the 1955 origin-destination survey, for example, one member of a household frequently provided trip information for absent members, but the accuracy of such secondhand data was not validated. In addition, survey results were not adjusted to reflect travel behavior of persons living in sample households where no one was at home, nor was the proportion of such not-at-homes even calculated. Direction and supervision of origin-destination surveys by a regionwide statistical unit having professional survey competence would insure avoidance of such inadequacies.

Third, and most important, the geographic division of the metropolitan area into traffic districts and zones should be thoroughly reevaluated. The major questions are the numbers of units necessary and the method of designing them. If survey data are properly conceived as adjuncts to forecasting models, which utilize other data as well, as noted previously, there is no point in obtaining more geographic detail than is consistent with the sensitivity of the other data. We suspect that far fewer traffic districts and zones are needed. Of equal importance, boundaries of districts and zones should be consistent with the geographical breakdown of data pertaining to other characteristics for which correlation with origin-destination data are desired. In at least some instances present traffic zones are not consistent with census tracts, frequently the smallest geographic unit for which any other data are available.

With respect to the selected estimates for 1955, 1965, and 1980, all of which are classified by traffic zones and districts, several points bear comment. So far as the types of data obtained are concerned, only labor force and employment are necessary for inclusion in a model oriented to the home to work commuting pattern. Income might have some value for purpose of correlation analysis. All data are estimates, including those for the base year (1955), and it is by no means clear how much gross error may have been introduced into those estimates by making them for traffic zones and districts, usually smaller than available data permit. The level of geographic detail necessary and useful for analytical purposes requires reconsideration. And, as also noted earlier, the critical element in forecasting transport needs is employment, which is in turn dependent upon future land use, for which methods of prediction are undeveloped or at best unsatisfactory. Improvements in transportation forecasts accordingly hinge most importantly on efforts to make land-use plans stand up for longer periods of time.

The preceding observations do not of themselves provide the details for a statistical program adequately meeting the need for transporta-

tion and highway planning. However, we believe they do provide a useful starting point for the development of such a program. Furthermore, if accepted only in part, our observations should make obvious the folly of proceeding with an elaborate system to maintain present data, as some have recommended to the joint committee,[7] when their values are questionable or undetermined. Continuous collection and processing of data are essential. But the specific types of data needed must be previously established.

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[7] By Robert B. Mitchell in source specified for note 4, p. 12; and by Ernest E. Blanche in source specified for note 2, p. 5, pp. 207–209.

IV. DATA FOR PLANNING ECONOMIC DEVELOPMENT

Issues related to future economic development in the Washington metropolitan area are potentially acrimonious and are perhaps too complex for detailed description in this report. They involve the basic question of the kind of urban development that is deemed desirable. Should Metropolitan Washington be a city composed primarily of Government establishments and the homes of people who work in them? Should it also seek to attract industry and the workers engaged in it? If so, what kinds of industry? Should it strive to become a center of retail and wholesale trade?

Such questions demand attention not only to political, esthetic, and psychological considerations, and to questions of national interest and attitude, but also to the basic economic resources that are available and that may at some point impose limits on development. Study of the patterns and rates of economic development within the region up to the present time is also essential, whether for the projection of developmental trends that are assumed to follow their own course, without the interference of "planners"; or for the calculations of the planners themselves.

The scope and complexity of economic development issues are so great that the types of information useful for their resolution are almost without limit. Formulation of the policy issues for which data are needed would therefore not reduce data requirements to proportions allowing full treatment in this report. Accordingly, we will confine discussion in this chapter to the availability of areawide data in seven major fields: population, school enrollment, trade and commerce, family income levels, income and wages, employment and labor force, and land use and housing. Many of these data are important for the solution of problems relating to transportation and highways and to water supply and pollution (discussed in chs. III and V respectively) as well as to economic development. Statistical information on prices, production, demography, weather, finance, recreation facilities and use, cultural and intellectual resources, taxation, and a host of other subjects of importance for development are not included, though whatever regional statistical organization may be created should make a place for these subjects in its program.

For the topics to which the present discussion is limited the major kinds of available data will be indicated, together with suggestions of the manner in which they might be usefully extended or improved.

POPULATION DATA

By far the most important data on population and its characteristics are obtained in the decennial census. Details about many significant population characteristics are collected from every household, are summarized, and published among other units, for counties, States, municipalities, minor civil divisions, standard metropolitan areas,

census tracts, and in some instances blocks and enumeration districts. Age, sex, and race are among the classifications for which data are available.

An important limitation of census-population data is the gross inadequacy for rapidly growing areas of 10-year intervals between enumerations. Public and private demands for current population data relating to small areas produce two principal results: Many independent and differing estimates of population are advanced, often little more than guesses. Second, where official authentication is desired and funds are available, the Bureau of the Census is frequently engaged to make a special census for individual cities or counties. Serious attention should be given to the need for a regular population census of the Washington metropolitan area midway in each decade between the decennial censuses.

Detailed data for small geographic subdivisions of the metropolitan area are not always readily available. Arrangements should be made with the Bureau of the Census for special tabulations of unpublished data (from existing machine sheets, at incremental cost) for enumeration districts or combinations thereof, when census tract data are insufficient for specific purposes. The growth of the outer parts of the Washington metropolitan area has been so rapid that such special tabulations should probably be arranged for 1960 census information, and for comparative purposes, perhaps for 1950 census data as well.

SCHOOL ENROLLMENT

Local school systems and individual schools are obvious primary sources of data on school enrollment within the area. For many schools information is maintained currently, is published at least once a year and in some cases monthly, and it often contains detailed classifications by age or grade, sex, and race. Principal deficiencies are the comparative lack of data for private- and parochial-school enrollments and the varying frequency and detail of published data. Coordination of statistical reporting by local school systems is highly desirable, both to include schools presently excluded and to standardize items and frequency of information reported.

Another important source of school-enrollment information is the decennial census. Every 10 years the Census Bureau collects and publishes data (based on a large sample) on school enrollment by age and race. Data are published for standard metropolitan areas, counties, and larger urban places, thus including all seven geographical components of metropolitan Washington. One advantage of census data, as compared with that available from local schools, is that they include college and graduate-school enrollment. Principal disadvantage is the infrequency of reporting. To overcome this disadvantage, several counties in the area in recent years have taken special school censuses, including school-age population and school-enrollment information.

TRADE AND COMMERCE (RETAIL, WHOLESALE, SERVICE)

The Quinquennial Census of Business, undertaken most recently in 1954 by the Bureau of the Census, is the leading source of significant detailed information on the activity of retail, wholesale, and selected

service enterprises. Individual firms and proprietors are classified in one or another of a great many types of business. For each type of business the census reports, among other data, the number of establishments, annual sales volume or receipts, payroll, and number of employees. Geographic breakdown is fairly complete: Detailed data are available for the Washington metropolitan area and for each of its seven components. In addition, in the 1950 census detailed breakdowns are presented for 2 cities in Montgomery and 6 cities in Prince Georges for all 3 of the major trade categories. Retail and service trade data are shown separately for five other cities in Prince Georges County.

The censuses of business have limitations as statistical tools for economic and market analysis within a particular urban area like metropolitan Washington. No geographic breakdown within the very large areas of Arlington and Fairfax Counties or the District of Columbia is available, comparable to the data for cities in the Maryland counties. A regionwide statistical organization might usefully attempt to develop geographic units, oriented as much as possible to major shopping districts, for which census data could be separately classified. It is probable that at minimal cost the data collected in the 1954 census, or in the forthcoming 1959 census, could be reassembled by the Bureau of the Census for this purpose.

Of equal or greater importance, the business censuses, based on establishments, do not obtain data of sales by product groups, which have great relevance for business. A regionwide statistical organization might profitably explore local interest in the methods for collecting distribution census data on a product basis, perhaps pointing the way toward Census Bureau experimentation with such an approach in the metropolitan area.

Coverage of service trades is weak as compared with retail and wholesale trade. For the most part such groups as medical, legal, radio-TV broadcasting, educational, finance, insurance, real estate, and various nonprofit services are not included. Extension of censuses to these fields would be useful for area planning purposes, although some of the technical problems (i. e., the close relationship between sales volume and personal income) are formidable.

Although the censuses of business are the only important source of information for retail, wholesale, and selected service trade of which we are aware, it seems likely that local information, often closely guarded, has been obtained for the guidance of businessmen in such matters as the location of shopping centers. Such information doubtless includes figures on business volume, local product sales, etc. A regional statistical program might well attempt to include whatever useful and valid information of this sort can be obtained and used, with full regard for and protection of its confidential character.

FAMILY INCOME LEVELS

One of the most important facts about people for purposes of economic, social, and market analysis is the level of family income. So far as we know, the decennial census of population is the only public source of data on levels of family income applicable to small geographic areas. Internal Revenue Service data cannot be made available below State levels, for technical reasons. The census of

population obtains data on family income classified by some 14 broad income categories Data are available for geographic units as small as census tracts. Infrequent and irregular sample surveys, as for example, that conducted by the Census Bureau in 1957 for the District, may occasionally update decennial census income data.

The importance of income data together with the infrequent census collections make it desirable to explore alternative or supplementary sources, potential or actual. Indirect methods, using correlation analysis and inference, might well be explored by a regionwide statistical unit: real-estate assessments or rentals, occupation, education, and job position, all offer possibilities of estimating family income levels.

At least one private source of data on family income levels has considerable promise: The annual Consumer Analysis Survey of the Washington Evening and Sunday Star. This survey, which is part of a multicity program primarily to determine brands preferences for leading consumer items, incidentally obtains family-income data, by seven broad income categories. Scientific sampling procedures are apparently employed, and the response rate is exceptionally high (about 90 percent overall completion, of which about 10 percent refuse response on income).

Because the interest of the publication is focused on its own major distribution complex within the community, it limits the survey to those geographical segments which have fairly concentrated populations (the ABC city zone). Included are all of the District, Arlington, Alexandria, and Falls Church, plus 2 "city districts" in Montgomery and 9 "city districts" in Prince Georges. Fairfax County is entirely excluded. Sample size (about 5,000) and design are sufficient to permit accurate breakdowns for the larger of these geographic units, but possibly not for the smaller ones. The effectiveness of this survey seems great enough to warrant efforts by a regionwide statistical organization to broaden its geographic scope and sample size so that more detailed and reliable family income information might be obtained for the entire metropolitan area. Although interviewing is normally undertaken between Thanksgiving and Christmas, preliminary results on personal income are available as early as mid-January.

INCOME AND WAGES

State employment security agencies, including the District of Columbia Unemployment Compensation Board, collect information each quarter on monthly employment and total wages of workers covered by unemployment insurance, including civilian employees of the Federal Government. In Maryland and the District of Columbia, all firms in subject industries are covered, regardless of size, but Virginia excludes firms with fewer than four employees. The Maryland and Virginia agencies both publish data on employment and wages covered by unemployment insurance by county each quarter, with some limited industry distribution, and the Bureau of Employment Security publishes the data by State (showing District of Columbia separately) and major industry group each quarter in *Employment and Wages*. These data, published with a 6- to 9-month lag, cover a very substantial proportion of total wage and salary income in the area.

Earnings information is also obtained monthly by the United States Employment Service for the District, in cooperation with BLS and BES, for a sample of establishments. Data on average weekly earnings, average weekly hours, and average hourly earnings for manufacturing only and for four manufacturing subgroups are published for the entire area alone. Local figures appear in the District USES' monthly Labor Market News, while the same data together with comparable information for other metropolitan areas is published in the Bureau of Labor Statistics' monthly Employment and Earnings. This kind of information is probably of great value both as economic indicators and as guides to prospective manufacturers, indicating the attractiveness of the local market from a labor-cost standpoint. Extension of coverage to nonmanufacturing industries, perhaps with modified data categories, would appear a worthwhile endeavor for a regionwide statistical agency.

EMPLOYMENT AND LABOR FORCE

The Bureau of the Census, the United States Employment Service, the Civil Service Commission, the Department of Defense, and State Employment Security agencies (including USES and Unemployment Compensation Board), all contribute data on employment in the Washington metropolitan area and in some or all of its principal geographical components. Detailed information is obtained in the decennial census for all persons 14 years of age and over on employment status, occupation, industry affiliation, sex, and age. These data are available for census tracts within the Washington metropolitan area. Place of residence rather than place of work is of course the basis of classification. Once again, the infrequency of decennial enumerations is the major limitation upon these data, although the imminence of the 1960 census will be a mitigating factor in the near future.

For more current information and for indications of short-term trends other sources are generally more useful than the decennial population census. In addition to the employment data based on unemployment insurance records mentioned above, the United States Employment Service for the District, in cooperation with the BLS and BES, compiles and publishes information each month (in Labor Market News) on estimated total employment by two-digit standard industrial classification for the entire metropolitan area. These estimates are based on a sample establishment reporting system tied to the unemployment insurance data as a benchmark.

For Federal employees, the Civil Service Commission tabulates monthly for the standard metropolitan area only, every two years. for each of its seven components, and in alternate years for the District, suburban Maryland, and suburban Virginia the number of Federal employees by sex. The Defense Department tabulates its total military employment for the standard metropolitan area only each month, but arrangement could perhaps be made to have Defense furnish the data separately for both city and county. Public employment of municipalities and counties within the area as of April 1957 have been published by the Bureau of the Census as part of the 1957 decennial census of government. More current city and county public employment data can be obtained from most local jurisdictions, usually

on an annual basis. Estimates of local public employment are also made monthly by BLS.

It is worth noting, however, that a regionwide statistical program could effectively work toward the improvement of available employment and labor-force information in three major respects: extending coverage to groups not presently included (such as employees of international and foreign organizations), increasing the amount of geographic detail shown in reported data, and increasing the frequency of compilation by those groups for whom information is available only on an annual basis.

LAND USE AND HOUSING

Together with population and related information, data on the use of land are perhaps the most vital for a multiplicity of decisions which have to be made by various public and private groups in the community. And, like the people who use it, the purposes to which land is put and the conditions under which it is employed are constantly changing. Planning agencies especially must keep constantly abreast of land-use developments in order to conceive new or revise old plans in light of current patterns. Officials in charge of regulating public housing, sanitation, and health, and urban renewal must be constantly alert to physical and economic conditions of existing structures; while private building contractors, developers, and those with esthetic or humanitarian instincts share common subject matter interests from widely divergent motives. The vast number and types of persons concerned with land-use data can scarcely be overestimated.

The degree of interest in at least certain aspects of land use is matched by the amount of data available. At the Federal level, the decennial census of housing obtains detailed information on numbers of dwelling units, by occupancy, by type, age, and condition of structure, by persons per room, by sanitary facilities, by certain utility services, by various electrical appliances, and by rental or sale value. Most of those data are available by census tract, some by block and enumeration district. Principal limitation of these, as of all decennial census data, is their infrequent compilation. Furthermore, housing is only one aspect, albeit the single most impotrant and dynamic, of land use.

The greatest array of information about detailed uses and characteristics of land and the properties contained on it are to be found in records of local public agencies. Ironically, the plethora of available information is equaled, if not surpassed, by the almost complete absence of methods for maintaining it on a systematic basis, so far as we have been able to determine. Furthermore, most data appear to be in raw or visual form, thereby reducing their value for statistical purposes. Aggravating this problem is the fact that a number of different local agencies within a particular jurisdiction, each concerned with its own responsibilities for certain aspects of land use, pay relatively little heed to the stake of other agencies having interests in data which they are collecting. As if these factors were not enough, differing concepts, definitions, legal requirements, and working approaches as between the various geographic components of the metropolitan area make comparisons of data hazardous in the extreme, in those limited instances where statistical information is available at all.

Assessment and taxation offices collect all kinds of data for residential and commercial buildings based upon field investigations, the frequency of which vary widely. The recent reassessment survey in the District, to which reference was made earlier, resulted in over 100 items of data for every building in the city, with a separate file card for each. But, typically, the data are not in convenient form for use by others. Licensing and inspection offices, whose functions vary somewhat among jurisdictions, take all sorts of actions every day with respect to land or property, most of them affecting use or quality characteristics: they issue building permits, make field investigations, or take other actions for which records are kept, almost universally by manual methods, and uncoordinated with other data affecting the same land or property. In part frustrated by the inadequacy of data kept by others which are relevant to their needs, planning bodies frequently have to collect their own basic information through field surveys, within limits of time and funds, although usually on a crash basis and then for only selected areas. But data become quickly out of date, especially in fast-growing suburbs, and the process repeats itself.

This challenging and complex problem is ideally suited to diagnosis and prescription by a regionwide statistical organization, which would be well advised to give it high priority in an overall statistical program. Two basic approaches seem especially worthy of consideration.

First, an attempt might be made to determine whether data relevant to land and property use responsibilities of appropriate agencies can be tabulated by a machine-processing system. Cities like Providence, R. I., have found such an approach essential. This would require determinations of exact information requirements by all interested parties, including the geographic units for which data were desired. In addition, care would have to be given to procedures for maintaining data on a current basis, and relevant administrative or other action affecting a parcel of land or property would require a new punchcard to reflect it. Special tabulations could be made at any time for particular needs, with summary tabulations prepared at regular intervals, perhaps once a year. It should be noted that this kind of system could serve day-to-day operating purposes of particular agencies interested in individual cases or properties as well as statistical needs, since many duplicate sets of cards could easily be maintained.

If a standardized continuous data-processing system is not feasible, either because of inherent informational proolems or political difficulties, the best alternative from the data standpoint would seem to be periodic central collection throughout the entire metropolitan area of specific data items considered vital. This approach has been successfully applied on an annual basis in Cleveland for many years. The Cleveland Real Property Inventory has conducted an annual census of family units by census tracts in all of Cuyahoga County and the western section of Lake County. Information obtained includes number of structures, number of family units or dwelling units, and occupancy status—all by type of dwelling. The number of dwelling units under construction is also obtained. Data on the number of retail stores and service establishments, by type, in each census tract and in each shopping center, and on other types of buildings (schools, churches, offices, industrial plants) are also collected.

V. A STATISTICAL PROGRAM ON WATER SUPPLY AND POLLUTION

As compared with transportation and economic-development problems, those relating to water supply and pollution are relatively easy to handle from the information standpoint. Since they concern physical phenomena, water supply and pollution problems lend themselves more readily to measurement and prediction than the others, which have an aggravating tendency, like the people who create them, to elude accurate forecasting.

There appear to be three major policy issues respecting water toward which a statistical program could effectively by directed:

(*a*) How much water is available to the metropolitan area to supply present and anticipated requirements?

(*b*) What is the present and potential demand for available water?

(*c*) How serious are the effects of pollution and other factors on the quality of our available water?

DATA REQUIREMENTS

To meet the information requirements implied by the above issues, we believe a regional statistical program should embrace the following components:

(*1*) *Supply*

For each currently utilized and potential source of water within or available to the metropolitan area, we need to know the short-term, seasonal, annual, cyclical, and long-run changes in the supply. Of major importance is the Potomac River, but both the Patuxent and Occoquan Creek are significant secondary surface sources. Continuous records of streamflow are one needed element. When used in conjunction with information on existing or prospective water-storage facilities, on the flow requirements for carrying wastes downstream, on upstream diversion and on evaporation and other loss, such data will provide accurate indications of water availability from river sources. Although current usage of water from these sources is relatively unimportant, groundwater supplies might be potentially significant. Their possible contribution to long-term water supplies in the area would therefore be well worth knowing.

(*2*) *Demand*

A continuing inventory of current average and peak demand levels for water, in terms of actual consumption by day, season, and year, should be maintained for comparison with supply data and for operational purposes in planning service facilities. Data should reflect the volume and the proportion of total demand by each major user category, such as residential, commercial, industrial, and agricultural.

When correlated with data on population, family units, and type of dwelling units, per capita consumption statistics for residential users can be developed and hence aid in forecasting future demand levels.

Since residents are the most important water users within the metropolitan area, knowledge should be obtained of consumption patterns by type of domestic use, especially those uses which may be significantly heavy, such as for lawn sprinkling, automatic washing machines, swimming pools, and water-type air conditioners. Similar statistical refinement for the commercial, industrial, and agricultural water-using sectors might also prove valuable. Data on quantities of water consumed by types of firms or activities within those three groups, correlated with growth trends for these subgroups, would help pinpoint the nature and the potential increases of water demand. Such potentially vast consumers of water as irrigation projects and chemical industries would especially bear watching.

Although not a component of a continuing statistical program, the role of price in the demand for water is worthy of study. Increased service charges to water users in the District may have resulted in decreased per capita consumption, contrary to trends in many other areas. Projections of future demand levels for water should, therefore, not ignore price considerations.

Information of the foregoing kinds would have value for marketing research as well as for planning by public agencies of extensions of water facilities.

(*3*) *Quality*

Water quality is significant not only for the maintenance of an effective water supply but also for recreation, navigation, the survival of fish and other water life and aesthetics. According to local authorities, the leading problem of water quality for which data are needed in the solution is pollution.

This is a highly complex and technical problem about which comparatively little is known. Perhaps the major contribution toward its solution therefore lies in special studies by competent experts. Examples include the chemical, radiological, and biological effects of waste effluent, the capacity of rivers to absorb sewage and other wastes, the minimum streamflow necessary to carry wastes downstream, and the ability of soils to absorb sewage from septic tanks. A particularly vexing component of these technical problems is the effect of synthetic detergents, increasingly used for household laundry and other purposes, and apparently immune to treatment, on the waters into which they are emptied.

Statistical data, however, may usefully supplement special studies for certain aspects of water quality problems. Analyses of continuous or periodic samples of water at carefully selected stations, designed to measure the levels of harmful ingredients, can help to locate particular problem areas and to indicate water quality trends over time. Great care is necessary to insure that enough check points are used to obtain adequate data for a river as important to the life of Washington as the Potomac, and that sampling techniques permit comparability among these data. Equivalent information for underground water supplies would also be useful.

Continuing data on rates of siltation at various river points are essential to identify the sources and the magnitude of this problem.

Information on the number of septic tanks by small geographic area, by number of dwelling and family units and acreage, with appropriate ratios, might cast some light on the problem of pollution from that source when related to soil-survey data.

STATUS OF AVAILABLE INFORMATION

(*1*) *Supply*

Long-term flow data are available for surface water sources of supply, principally from Geological Survey's local records and annual publications on United States water supply in major drainage basins. Continuous records of stage and discharge are currently collected by the Geological Survey at approximately 91 stations in the Potomac Basin (including the Occoquan), about 30 of which have been in existence for 20 years or longer. Comparable data are available from 7 stations on the Patuxent and its tributaries, most of which have been operated for less than 15 years.

The principal deficiency of these data is their comparatively short history, at least for the newer stations. But the best remedy is time. In many cases, historical rainfall and related data collected by the Weather Bureau, and stage and discharge data obtained from discontinued stations, permit reasonable inferences as to streamflow for years preceding the actual collection of flow data at particular stations.

However, with the prospect of greatly increased diversion of water from the upper portions of the Potomac for industrial, agricultural, and residential purposes, methods must be developed for accurately measuring or estimating the amounts of water diverted so that the vagaries of nature may properly be distinguished from human contrivance in the fluctuations of streamflow.

Adequate basic information about ground-water supplies available to Metropolitan Washington is presently lacking. The only authoritative source of such data known to us is the Geological Survey, many of whose ground-water studies are published by other organizations. The Geological Survey is presently preparing a comprehensive reconnaissance report on ground-water supplies for much of the Potomac River Basin. Separate reports have previously been published for segments of the basin, including most of Maryland, Fairfax, and Arlington Counties. However, while reconnaissance reports help to identify major ground-water sources, more detailed information is necessary to permit determinations of economic feasibility, a major consideration in evaluating ground-water potentials.

It is the intention of the Geological Survey to provide a detailed examination of ground-water supplies in the metropolitan area as part of its comprehensive survey. When such data become available, it will be possible to make adequate studies of the potential role of ground water in the area for the first time, and to make more informed judgments about proposed storage facilities on the Potomac.

While ground water may not be capable of furnishing economically a large proportion of the area's water requirements, in particular small areas and for particular purposes it may be less costly to furnish than surface water. Communities like Memphis, Atlantic City, and eastern Long Island depend almost entirely on ground-water supplies. The Washington Suburban Sanitary Commission uses under-

ground sources regularly to supply a small proportion of its water customers, as do many private companies in suburban Virginia.

Furthermore, ground-water sources might effectively be used on a seasonal basis only, to meet peak demands in the summer. Economic feasibility studies should accordingly emphasize the marginal costs of providing ground water in relation to alternative sources. Only careful analysis of specific underground water supplies in relation to particular areas and conditions of use will permit informed judgments about the feasibility, cost, and desirability of developing them for meeting future water supply needs.

(*2*) *Demand*

Projections of future water demand in the Washington metropolitan area require data on population, housing, land use, and economic development trends, which are discussed in chapter IV, to estimate the number and types of units requiring water. In addition, data on water consumption patterns for each major user group are needed.

Long-term flow data are available for surface water sources of supply, principally from the Geological Survey's local records and annual publications on United States water supply in major drainage basins.

With respect to current levels of water consumption, overall data can be obtained in either of two ways: from organizations furnishing water from its primary source, or from those distributing it to the ultimate consumer. If the former approach is used, the Washington Suburban Sanitary Commission, the Army Engineers, the Alexandria Water Co., and the City of Rockville are the only four organizations furnishing water from river sources, which represent an overwhelmingly large proportion of all water consumed in the metropolitan area. Gross data on water volume entering the consumer distribution system at almost any time intervals can be readily obtained from these four sources. To obtain a complete picture, however, it would also be necessary to include water provided suburban Virginia users by private wells and by a number of small private companies using ground-water sources.

The second approach, obtaining water-consumption data from organizations distributing water directly to consumers, is not convenient. However, it offers the decided advantage of permitting classification of water consumers by type, which is impossible under the first approach, and hence provides the basis for developing needed consumption ratios for major types of users. The major problem of obtaining data on water usage by type of consumer from distributing organizations is that most of them do not keep their records in a form that would conveniently permit it. Of the public distributors, only Arlington County has reports (prepared monthly) showing the amount of water consumed by major groups. It uses a threefold classification of commercial (including government), residential, and apartments. The largest private distributor in the area, the Alexandria Water Co., classifies its customers by four major categories (residential, commercial, industrial, and government). All other major distributors cannot readily obtain consumption data by type of user. Unless agreement could be obtained among all leading distributors to standardize their recordkeeping and reporting activities, the most promising method of obtaining the desired information would be a detailed examination of a sample of individual billing records.

As indicated above, data needs on water usage include not only consumption by type of user, but allocation of use within major user categories. Such data are totally lacking and can only be obtained directly from individual consumers. While the need for this type of information does not call for a continuous statistical program, special studies from time to time designed to identify and measure heavy water-using activities are highly desirable. Irrigation, lawn sprinkling, swimming pools, water-using air conditioners, and certain industries illustrate types of water use in which the demand may be newly generated and especially great.

(*3*) *Quality*

Statistical data on water quality are currently available, but fall below the need. Under the overall guidance of the Interstate Commission on the Potomac River Basin, stream-sampling stations have been operated by several agencies on a regular basis in the metropolitan area at strategic points on the Potomac River and its tributaries (including the Occoquan). Stations are also in operation on the Patuxent River, which lies outside the Potomac River Basin. Sampling includes chemical, biological, mineralogical, and bacteriological data. Within the metropolitan area one significant omission from the sampling program is Accotink Creek, which may soon be carrying polluted water to the Potomac as a result of developments in its headwaters near Chantilly.

Several points should be stressed about the value of data obtained from the stream-sampling program. First, there is great need for improved coordination of sampling activities. Types of data obtained, amounts of detail provided, frequency of sampling and of reporting, and methods of analysis vary considerably throughout the Potomac Basin area. While the Interstate Commission is now attempting to standardize sampling practices, it has by no means attained this objective as yet. Furthermore, its jurisdiction does not encompass the Patuxent, whose sampling activities should also be coordinated. Second, sampling is done entirely during the daylight hours (at least for the Potomac) because of the working hours of the people who take samples. Expert chemical opinion indicates that nighttime sampling might turn up significantly different data, especially as to oxygen content and plankton growth. For that reason, the plan of the District Sanitary Engineering Department (which does most of the stream sampling on the Potomac in this area) to establish "permanent" sampling stations on Memorial Bridge, Fort Washington, the new Jones Point Bridge, and possibly one or two other points to develop nighttime as well as daytime data seems worth implementing.

Third, sampling is technically difficult in the Potomac because of its tidal characteristics. The location of water used for sampling purposes at a particular sample point varies widely in accord with tidal action, and data must be interpolated to reflect varying tidal and other conditions. Pioneering studies to develop sampling procedures adequate for tidal waters are badly needed.

Fourth, sampling would be greatly improved if a device were available for continuous recording of desired information at specified points. The Public Health Service has been experimenting with such a device for measuring oxygen content. The potential value of

continuously recorded data is great, particularly as compared with irregularly obtained data currently available.

Statistical data on water quality are also continuously collected and analyzed by organizations distributing water from its source and by sewage-treatment plants, essentially for internal operating purposes. Information from the latter on quantities of effluent discharged and degrees of sewage treatment would have some value in evaluating pollution factors shown by stream-sampling data.

Siltation is an important ingredient of pollution for which hardly any data are available. According to Wolman, Geyer, & Pyatt, in a recent study of the Potomac:

> The total amount of silt deposited in the Washington area has never been measured nor even carefully estimated.[8]

Aside from a 1938 survey in the Lake Barcroft area by the Soil Conservation Service, supplemented by a followup study in 1957 (which reportedly showed a fourfold increase in the rate of siltation), we are aware of no serious attempts to study the siltation problem, regarded by many authorities as more significant than sewage disposal. While many dimensions of the problem lend themselves only to special studies, some types of periodic statistical measurement and sampling appear useful (for example, amount of siltation in place over long-time periods). We understand the Potomac Basin Commission has requested the Geological Survey to design a plan for a 2-year preliminary survey of sedimentation in the Potomac Basin, utilizing new and promising sampling and measurement techniques. It would be a splendid accomplishment if such efforts could produce data adequate not only for measuring total levels of siltation but also for identifying its major causes or sources in particular areas. Data on siltation rates might also improve upon current knowledge of the economics of Potomac Dam storage facilities now being discussed.

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[8] Abel Wolman, John C. Geyer, Edwin E. Pyatt, A Clean Potomac River in the Washington Metropolitan Area, Interstate Commission on the Potomac River Basin (October 1957), reprinted in hearings before the Joint Committee on Washington Metropolitan Problems on Water Supply and Pollution Problems in Maryland, Virginia, and the Washington Metropolitan Area, 85th Cong., 2d sess., April 22, 23, 25, Government Printing Office (1958), p. 389.

VI. ORGANIZATION AND FUNCTIONS OF A STATISTICAL UNIT FOR THE WASHINGTON METROPOLITAN AREA

The need for a statistical program for the Washington area was expounded in the preceding chapters. All who are concerned with planning the future development of the region, whether public officials, businessmen, the executives of community organizations, or civic-minded citizens share in the need. Inseparable from such a program must be an instrument for developing it and guiding its execution. This is a task for a statistical unit which does not now exist and which must therefore be created for the purpose. The purpose of this chapter is to indicate the functions of such a unit, the character of its organization and its location with respect to the numerous interests related to its responsibilities.

A realistic statistical program for the Washington area will not long remain unchanged. It must be expected to evolve, undergoing continual change in the light of its own findings, the development of governmental structures and functions, the development and clarification of public policies, changing social attitudes and habits, and advancing technology. Continual adaptation of the statistical program to changing needs is thus a further task for the statistical unit we will describe.

FUNCTIONS

Statistical units have been established by governments, business firms and associations, community and other organizations, for a wide variety of specialized functions. Some, like the United States Bureau of the Census, provide information of general interest which is used for innumerable public and private purposes. By contrast, for example, a unit responsible for quality control within a factory may serve only a few narrow interests of that particular establishment. In both of these cases the data are collected from primary sources and must be summarized in some brief and convenient form. "Data processing" increasingly employs elaborate and expensive machine equipment, and may or may not be performed by the data-collecting agency. Like a factory process which is subcontracted, the "raw" data may be turned over for processing to a statistical organization specializing in such work.

Summary tables must be analyzed and intrepreted if they are to serve useful purposes. They must often be compared and combined with other information. At this stage statistics become an element in research; and specialization of functions again appears. Such distinguished organizations as the National Bureau of Economic Research and the Brookings Institution combine statistical and research activities; but the statistical data they employ are almost always obtained from secondary sources—i. e., have been collected and compiled by other agencies. Thus, the distinction between the functions

of statistical collection and tabulation on the one hand, and that of statistical analysis on the other, is frequently quite sharp.

Various other demarcations among statistical functions, that is, between the development of theory and its applications, between sampling and complete enumeration, between various areas of subject matter or types of administrative issues to which statistical methods are applied, could be described. All have resulted in a certain amount of specialization among the statistical units that exercise them. Quite distinct from all of the functions previously mentioned, most of which may be referred to as statistical "operations," is the function of statistical coordination. A statistical coordinating agency has the task of interrelating and in part therefore of planning, and to some extent of controlling, the programs and activities of statistical operating agencies.

Within the Federal Government of the United States it is a maxim of sound administration that the statistical coordinating agency (the Office of Statistical Standards of the Bureau of the Budget) should not have statistical operating functions. These would bring it into competition with agencies under its supervision, among which it must be judicially minded and neutral. By the same reasoning it was deemed inappropriate for a statistical operating agency like the Bureau of the Census to be given coordinating authority over sister agencies like the Bureau of Labor Statistics.

While conceding the soundness of these principles when applied to the Federal Government, we regard them as inapplicable to a new statistical unit set up to serve the Washington metropolitan area. In the absence both of permanent and effective statistical agencies devoted to the collection, processing, and analysis of data for the area, we would propose to assign both types of function to the new unit. Its role of statistical planning and coordination within the area would be unlimited in scope. Its "control" over the statistical activities of other agencies would be in the form of technical influence, depending upon recognition of its competence and prestige. Its functions of statistical collection, analysis, and research would be shared with other public and private agencies in the area to the extent that these could be stimulated to engage in them in a manner consistent with the general statistical program for which the new agency would be responsible.

The new unit, moreover, would have responsibilities appropriate to a central service agency, processing many data brought to it by public and private organizations, other than agencies of the Federal Government. We exclude Federal agencies from our conception of this role because many of the latter have machine-tabulating equipment under their own direct control, including high-speed electronic computers. Those which do not are usually able to arrange for access to the use of such equipment when required. However, it is unlikely that any other governmental units within the metropolitan area are in a position to become similarly equipped; and the same may be said of civic and semipublic organizations which are concerned with the area's problems of development.

In proposing central service functions of data processing for the new unit, we assume its freedom from restrictions which sometimes prevent governmental agencies from exercising such a role. It would charge for its services, which would be available to governmental agencies and to business and civic organizations alike. It would ap-

ply the payments received toward its own maintenance, including depreciation and replacement of equipment. By producing data of value to commercial firms for marketing purposes it might be able to obtain a substantial fraction of its costs for equipment and maintenance. It might ultimately become self-supporting, though this seems problematical.

Because of the importance of federally collected information about the metropolitan area, the new unit should work closely with the Office of Statistical Standards of the Bureau of the Budget, to which it should turn for the effectuation of changes in Federal data that it deems desirable for metropolitan area purposes.

To recapitulate, we propose that the new and central statistical unit for the Washington metropolitan area should have the following functions:

(1) In general, it should serve as the statistical coordinating mechanism for information pertaining to all or parts of the area, embracing data collected by Federal agencies, by the District of Columbia, by the States of Maryland and Virginia, by counties and cities of those States within the area, by other minor civil divisions, and by business and other private agencies. More particularly, its coordinating function would include—

(2) Attempts to standardize the data-collecting activities of comparable local jurisdictions with respect to the subjects covered; the concepts, categories, and definitions employed; the tabulations, if any made; the timing and frequency of the collections; and the areal or other units for which reported.

(3) Bringing persuasion to bear upon other agencies within the area to undertake needed collections of statistical data or the statistical processing of information which they have obtained for more limited purposes that could yield wider values. A corollary of such efforts at persuasion would be a readiness and ability to provide technical assistance to other agencies, particularly to those of local governments, in the improvement of their statistics.

(4) Searching for unpublished and/or unprocessed information that would be useful for area planning or other purposes additional to those that they may already have served. Many such data are in the files of Federal agencies. Others have served the administrative needs of State or local governments in such matters as tax assessments, tax collection, automobile registration, utility charges, registration of eligible voters, etc. Still others have been obtained by public utilities, banks and business establishments, with respect to such matters as the distribution of depositors, the installation or removal of utility services, the reading of meters, and delivery of newspapers or store purchases. Marketing studies by newspapers, broadcasting companies, and other business interests would fall on the same category.

(5) Maintaining an inventory of data and the location and character of data sources—the latter in situations of a type which do not permit the actual accumulation and storage of the data themselves. One of the most valuable acquisitions of a central statistical unit is knowledge of the places where information may be found, the status of its summarization and the problems of obtaining access to it. The information of the central unit concerning the characteristics of data sources (scope, periodicity, classifica-

tions, definitions, revisions, limitations, deficiencies, etc.) should be equivalent to that of a trained business librarian with respect to the working materials in her charge.

(6) If important statistical information is unavailable, the unit should be expected to promote its collection by other bodies; or failing this to have the facilities to make its own collection. In particular instances this function might be exercised on a "one-shot" basis. In others the collection might be periodic or continuous. Elsewhere in this report are suggested data requirements which may be met by the unit's own operations.

(7) Central services, especially data processing should be undertaken as soon as resources permit the acquisition of modern machine equipment. The unit's activity in this capacity, however, need not be limited to tabulations and computations on its own equipment with its own personnel. Following a modern trend, induced by the complicated nature and high costs of electronic computers, the unit may serve as a middleman. It may subcontract or otherwise arrange for data processing when its own machine equipment is inadequate or otherwise engaged. In such instances the economy and efficiency of central service for the metropolitan area could still be demonstrated.

(8) By becoming a central repository of knowledge about the information available for the Washington metropolitan area, the unit will be in a better position than any other agency to analyze and interpret the problems and trends that the data may disclose. It should seek to have upon its staff persons of competence to prepare analytical and interpretative studies of the data assembled.

ORGANIZATION

Three major elements are needed within the structure of a new unit which would perform central statistical services for the Washington metropolitan area. In hierarchial order, though not necessarily in order of importance, these are an unsalaried council or board, in which all area interests are represented; an executive director of high technical competence and skill in negotiations; and a technical staff.

The governing council should be widely representative, and would thus be relatively large. Appointments to it would provide opportunities to secure the cooperation of the jurisdictions and agencies that its members represent. These members need not themselves be professional statisticians or social scientists (though this would have advantages in many instances) but they should have an appreciation of the importance of accurate and comprehensive statistical information for community planning, and some understanding of the ways in which statistics may be used for that purpose. A small executive committee of 3 or 5 members and standing or ad hoc committees upon various substantive questions may be found desirable. The full council should meet at stated intervals to receive reports from the executive committee and the director and to pass upon their recommendations.

The executive director should be a person of proven abilities in public affairs and of recognized reputation as a statistician. Subject to determination by the council of the major directions of effort by the unit, he should have wide discretion in directing its affairs.

The senior professional staff should likewise be composed of statisticians with proven experience and established reputations. It should include an assistant director with qualifications second only to those of his chief. The number of additional members would initially depend upon the resources available, but is visualized here as numbering from 4 to 8 at the outset, if secretarial and semiprofessional assistants be included. In making appointments political considerations should be excluded and the United States Civil Service Commission might be requested to assist in the work of staffing the unit. Careful attention should be paid to the types of activity with which the unit will initially be concerned, and to the corresponding areas of technical competence to be sought in candidates.

Many questions related to organization of the unit are beyond the scope of this assignment. How is the creation of the unit to be brought about? What legal authorities can be drawn upon in giving it existence and vesting it with responsibilities? What, if any, authorities can it exercise? What agencies or groups will be its sponsors? To whom will it be responsible? How is it to be financed, initially and thereafter? We leave these questions largely unanswered. The specifications we set forth are intended to be illustrative and would undoubtedly be modified in important particulars if creation of such a unit is attempted.

LOCATION

Until some of the questions raised but unanswered in the preceding paragraph can be settled, the location of the new unit cannot be recommended with assurance. We have described the statistical arm of a governmental, or semigovernmental authority for the metropolitan area that does not now exist. Should it be established the statistical unit should find appropriate lodgement within its structure. If the statistical unit should precede a more general areawide authority, the first must take lodging with whatever host seems most likely to provide adequate and continuous sustenance.

Among the possible alternative locations among existing organizations to which we have given some thought are the following:

(*a*) Joint Committee on Washington Metropolitan Problems.

(*b*) House or Senate District Committee.

(*c*) The Interdepartmental Statistics Committee of the District of Columbia Government, or a department of that government.

(*d*) United States Budget Bureau, as an adjunct of the Bureau's Office of Statistical Standards.

(*e*) The National Capital Regional Planning Council.

(*f*) The Washington Center for Metropolitan Studies.

(*g*) The Washington Board of Trade.

The first of these possibilities seems ruled out by the temporary nature of the joint committee; while both the first and second would involve questionable relationships. The District committees have jurisdiction over the District but not the remaining portions of the metropolitan area. The same disability would apply to any agency of the District government that might be considered under alternative (*c*). However, the other jurisdictions within the area might be willing to accept District leadership, provided the functions of statistical coordination exercised by a District agency were advisory only.

The Office of Statistical Standards of the Bureau of the Budget administers responsibilities established by law for the coordination of Federal statistics, some of which, like statistics of population, income, employment, production, and trade, are important components of any library of working data for the metropolitan area. We have already noted the importance of close working relationships between a statistical office for the area and the Bureau of the Budget, to whose Office of Statistical Standards the first must look for any action related to changes in Federal statistics for the area. The interstate character of the Washington metropolitan area and its importance as the seat of the Nation's capital would both appear to justify the attachment of an office for statistical development and coordination within the area to the Federal office which has the same functions for the Nation at large. There may be objection to this location for the function on the grounds that the Bureau is a staff, rather than an operating agency. However, experience gained by the Office of Statistical Standards in the adaptation of federally collected statistics to the needs of the Washington metropolitan area could be used in meeting the responsibilities of this office for assuring the quality of Federal statistics to meet the needs of all metropolitan areas.

The fifth alternative location has two advantages held by none of the others except the first: the National Capital Regional Planning Council is (*a*) an official but representative agency (*b*) whose jurisdiction is substantially coterminous with the Washington metropolitan area. Moreover, (*c*) its responsibilities demand attention to precisely the kind of questions with which a statistical unit would be concerned.

The sixth alternative shares with the fifth, the second, and third advantages we have just attributed to the latter. The Center for Metropolitan Studies will be devoted to the same types of interests for the same urban region as the National Capitol Regional Planning Council. It will not, however, be an official instrument and the prospects for its continued financial support on an adequate level are unknown to us.

The last of our alternatives, the Washington Board of Trade, like the Metropolitan Area Studies Center, is an unofficial organization. In recent years it has shown great initiative and displayed much capacity for leadership in the promotion of metropolitan-area studies and programs. The fact that both of these organizations are privately sponsored should not eliminate them from consideration as the location of central statistical functions, especially since the unit we advocate in this report would serve both public and private interests. It is not improbable, on the other hand, that the identification of the Board of Trade with Washington (rather than the metropolitan area) and with business interests (rather than all segments of the community) would disqualify it for the central statistical role within the region.

In addition to the considerations we have mentioned in reviewing the preceding possible locations, several other factors should be influential in a choice:

(*a*) The unit should be neutral among the jurisdictions and agencies with which it must work on behalf of statistical coordination within the area.

(*b*) All of these jurisdictions and agencies should have a share in its creation and its activities, thus feeling identified with it.

(*c*) There would be practical advantages in attaching the unit to an organization in possession of legal authorities; a secure, recurrent budget; and an operating staff.

Among the possible locations that now exist, as reviewed above, our choice has been narrowed to the fourth and fifth (the Budget Bureau and the National Capitol Regional Planning Council) with the sixth (the Metropolitan Area Studies Center) in third place. Should a *metropolitan area governing body* be created (as in Toronto or Miami), the central statistical unit for the area would naturally be a part of its organization. Were several such authorities created for different subject areas (water, transportation, economic development), new problems of statistical coordination would arise and necessitate further review of the question here raised.

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